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ABSTRACT

This Missouri Vocational Instructional Management System module offers a description of both instructional and cognitive strategies for special needs students and suggestions for their use in a variety of classrooms. Fourteen definitions, 13 frequently asked questions, 5 resources, and 21 references are included. The following questions are answered: What is a strategy? What learner characteristics indicate that a student needs to acquire strategies for learning and utilizing strategies to learn? How can strategy usage be evaluated? How can metacognition promote motivation? How can the teacher help students learn strategies? What strategies might be taught in classrooms? What are some examples of instructional strategies and cognitive strategies? Why should I teach strategies? How often do I need to use instructional or cognitive strategies? How can I determine if the strategies are effective? and Where can I get more information about both types of strategies? (four sources are listed). The following resources are included: (1) sample strategy evaluation; (2) bridging comparison lesson; (3) sample worksheet for Survey, Question, Read, Recite, and Review (SQ3R); (4) mapping; and (5) math word problems using HEART (How much do I know? Establish purpose, Ask questions, Record steps, Test yourself). (NLA)

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Strategies for Students With Special Needs

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Abstract:
A critical element in assisting students in the learning process includes the use of both instructional and cognitive strategies. This module offers a description of both types of strategies and suggestions for their use in a variety of classrooms.

CE058 617

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Overview

Classroom teachers often speak of their students as unmotivated, pointing out weaknesses displayed by each. As lessons are presented, these "unmotivated" students may be seen doodling--or even sleeping in class. Teacher as well as student frustration is an expected outcome of such a situation. It is possible to change this type of situation by utilizing strategies in the classroom.

The purpose of education goes beyond learning the content. Education is much more accurately described as *learning how to learn*. Students can enhance their learning by becoming aware of their own skills as they listen, read, write and experience interactions in school situations. Teachers can promote this learning by assisting students in exploring **how** they learn **while** they are learning. Learning to effectively use strategies may encourage students to take responsibility for their learning and to affect positive self-perception as well as motivation (Paris & Winograd, 1990).

Much of the instruction provided students with special needs is directed toward helping them acquire elementary units of knowledge. When the units are not sufficiently learned, teachers assume skills must be practiced repeatedly until they are mastered. Consequently, some students continue in a basic skills curriculum even in high school. This generates a problem in that students may never acquire these units, or fail to use them in context when needed. Students are then robbed of important opportunities to learn (Reid, 1988).

A critical element in assisting students in the learning process includes the use of both instructional and cognitive strategies. This module offers a description of both types of strategies and suggestions for their use in a variety of classrooms.

Definitions

Cognition	The act of structuring information; the understanding and control of learning. It includes perception, attention, memory, storage and retrieval (Guilford, 1977).
Cognitive/Learning Strategy	Techniques the student uses to acquire knowledge.
Declarative Knowledge	The content or *facts* of a discipline.
Instructional/ Teaching Strategy	Techniques utilized by the teacher to enable students to learn more effectively.

Learning Style	The innate sensory and interpersonal methods a student prefers to use to acquire knowledge, such as visual, auditory, kinesthetic, etc.
Memory	Putting items into storage.
Metacognitive	Self-knowledge of how we learn and our control of those learning processes.
Metamemory	The interaction of the learner, the material, and the task along with flexible processing strategies.
Procedural Knowledge	The knowledge of *how* to do something.
Productive Thinking	Retrieval of information from storage.
Schema	Abstract knowledge structures that organize familiar experiences and provide a framework for making inferences (Shank & Abelson, 1977).
Self-Evaluation	Realistically addressing the proficiency level of one's self to perform a given task.
Self-Monitoring	Self-monitoring permits the individual to observe and self-record progress. It allows one to keep track of how well the information is being understood and includes self-questioning, note-taking, reviewing, and so forth.
Strategy	A strategy is a planned, deliberate activity used to acquire knowledge.

Q. What is a Strategy?

A. A strategy is a planned, deliberate activity used to acquire knowledge. Cognitive strategies provide techniques for structuring information to be used in a variety of situations. Students with special needs often have few, if any, strategies for acquiring or structuring information. For example, these students may have difficulty reading. They may have no idea of how to remediate the reading problem or why it exists. Some students may have little difficulty reading and still have difficulty recalling or reusing the information gathered at a previous time to be used in some future activity. We must teach students to become aware of their own strategies and to become good troubleshooters in the learning process. *We do this by teaching strategies.*

Q. What Learner Characteristics Indicate That a Student Needs to Acquire Strategies for Learning?

A. Learners with special needs often appear to be passive, unmotivated students with little use of strategies, poor memory functioning and limited prior knowledge. It is important to believe that passive learners can become active learners. This change can happen by teaching students to use strategies.

Q. What Learner Characteristics Indicate the Student is Utilizing Strategies to Learn?

A. Students who are active learners utilize some forms of strategies when they use prior knowledge to solve current problems, construct meaning from new information and demonstrate motivation. Those who do not exhibit these characteristics need to acquire strategies for learning.

Q. How can Strategy Usage be Evaluated?

A. Deshler and Schumaker (1984) indicated that adolescents who "learn how to learn" in secondary schools will be in a much better position to learn new skills and to respond to rapidly changing information and conditions for the future. This learning *how* to learn is the purpose behind the use of strategies.

Example Strategy Evaluation

The marketing and cooperative education teacher presents a lecture in his class on salesmanship. He presents the material, utilizing an effective lesson plan with high student involvement and discussion. Following the lecture, some students remain unable to explain or demonstrate appropriate salesmanship. The marketing instructor remembers these students when planning lectures and examines ways to help the students learn. During the lecture, the instructor notices some of the students do not take notes. The instructor realizes that a few of the students have deficits in spelling, and will not be able to take notes from a lecture. An outline of the lecture is provided for these students and the lecture is stopped periodically to insure that all students are comprehending the information.

This type of evaluation by observation allows the instructor to conclude that some students do not only have spelling deficits, but may have strategy deficits. They may not have strategies for acquiring new knowledge. Strategies must be developed by allowing students to gather the information necessary for learning. Direct instruction on how to use the information presented, along with discussion and self-questioning can allow the student to acquire a technique to learn how to learn new information. (See Resource section for an example of *Strategy Evaluation*)

In order to teach strategies to students, it is important to first evaluate what strategies students are currently using to solve problems or acquire new knowledge. This can be accomplished through observations such as in the example above, interviews, discussions or group problem solving situations.

The results of an evaluation of strategy usage leads to metacognition (self-understanding) of how we learn. This evaluation allows for personal appraisal and management. Metacognition or self-knowledge enables cognitive development and represents the kind of knowledge and executive abilities that develop with experiences and schooling (Paris & Winograd, 1990). This self-knowledge then promotes motivation in learning situations. **Skill** and **will** are interwoven in reflection and anticipation about learning (Corno & Mandinach, 1983; Covington, 1983; Nicholls, 1983; Paris & Cross, 1983). Metacognition enables students to manage their own learning and empowers them to be inquisitive and persistent in their pursuits (Paris & Winograd, 1990).

Q. How can Metacognition Promote Motivation?

A. Metacognition provides cognitive tools for acquiring knowledge in school or school-like situations. Secondary students may need to question their previous related experiences when a new unit is introduced. The students may then apply such strategies as skimming, reciprocal teaching, summarizing, self-questioning, paraphrasing and so forth to analyze the topic. If students have no knowledge of how they learn or how to use previously acquired information, they may have great difficulty learning or being motivated to learn.

True learning is promoted by curiosity and persistence. This curiosity is bolstered by the innate sense of ability to accomplish a goal. Strategies, and knowledge of how to use them, help students understand that all learning involves overcoming obstacles, confusion and self-doubt. Once a student has some strategies to *learn how to learn*, motivation may be increased along with self-esteem.

Q. How can the Teacher Help Students Learn Strategies?

A. Teachers can help students acquire knowledge of how to learn by allowing students to discuss their thoughts and feelings about learning with the teacher in order to promote metacognition **and** motivation (Paris & Winograd, 1990). Teachers must teach students strategies embedded in the content of the course. Deshler, Alley, Warner & Schumaker (1981) have shown that learning strategies are most effectively mastered if an eight-step procedure is followed. That procedure includes:

1. Analyze current learning habits.
2. Describe the new strategy.
3. Model the new strategy.
4. Verbally rehearse the strategy.
5. Provide controlled practice and feedback.
6. Use grade/age-appropriate practice and feedback.
7. Post-test.
8. Generalize the strategy to other situations.

The major tenets of the cognitive approach to learning is that cognitive structures are modifiable. That is, we can change how students learn. Thinking processes can be taught, but learners must be **actively** involved. Metacognitive skills can be taught while lessons activate prior knowledge. Teachers need to emphasize the interconnectedness of all information. When students ask *why* they are studying a topic, a logical explanation needs to be provided to emphasize the meaningfulness of the information.

Q. What Strategies Might be Taught in Classrooms?

A. There are many types of strategies utilized in classrooms today. This module describes two categories of strategies including instructional/teaching strategies and cognitive/learning strategies.

Instructional/teaching strategies are techniques utilized by the teacher to enable students to learn. Instructional strategies include those activities the teacher plans in order to help students of all learning abilities acquire information being presented.

Cognitive/learning strategies are those techniques the student uses to acquire knowledge. Students must be taught how to effectively acquire knowledge. Frequently, students with special needs have acquired few, if any, real techniques for learning. Any techniques which have been acquired may be effective some of the time, but often are not effective in every situation. This results in failure for the student when confronted with new information. A wider variety of cognitive strategies enables students to confront new information and/or situations with a strategic plan which allows for successful learning.

Q. What are Some Examples of Instructional Strategies?

A. A number of strategies may be used by the teacher to better enable students to acquire new knowledge. Some of these strategies include the following:

Reciprocal instruction is a dialogue between the teacher and students regarding the text they are reading or information being presented. The teacher and students take turns leading the discussion with the dialogue structured through the use of four strategies.

1. The passage is examined by exploring important parts, integrating and summarizing.

2. Questions based on the summary are then generated. The questions must be substantive and the answers must be able to be provided by the person generating the question.

3. The passage must be clarified. Many students with reading or learning difficulties may believe the purpose for reading is simply to pronounce words correctly. Deriving meaning from the passage may be inconsequential to some learners. As questions are asked and answers are not available, students should be cued to reread, ask for help or further discuss the possibilities to clarify the information being presented.

4. Predictions must be made about what the author may discuss next. In order to make such predictions, students will have to utilize prior knowledge and try to add to it.

The interactive nature of reciprocal instruction provides support in the learning process. The cooperative efforts between students and teachers utilizing this strategy support the questioning process, while thinking aloud offers structure needed toward acquiring correct responses.

Scaffolding provides temporary and adjustable support in the learning process and is a type of extension of reciprocal teaching. In scaffolding the teacher provides support by explaining, instructing and modeling. This support is temporary while the student is further challenged to use reciprocal instruction independently as the level of comprehension increases (Reid, 1988).

Test-Teach-Test-Reteach as a method has been found to be "tried and true," but often takes more time than other methods. When using competency-based education the test-teach-test method meshes easily and therefore works well in vocational education courses. This strategy can be utilized in all classes. This approach delineates the needs of all students, allows the more advanced students to learn at a faster rate and the slower students to explore the information until competency is acquired. Pretesting a student on new information allows the teacher to determine the student's level of skill and adjust curriculum and activities to the needs of each student.

Cooperative learning provides group learning with the goal of reinforcing each other's knowledge and understanding. These groups must be well structured to include the following criteria:

- no more than 4-6 students in a group;
- heterogeneous by ability and language;
- multicultural;
- provide a fair reward system (group grade may be fair in some situations);
- administer individual tests, but group members test grades are averaged for final grades;
- maintain groups for 4-6 weeks to work out group dynamics before changing;
- describe each member's responsibility, clearly defining specific roles within the group. Roles defined should require different skills so all students can function in some capacity and specify how grades are determined; and
- student developed group rules with teacher assistance.

Life frequently offers opportunities for cooperative learning. The educational system can teach students how to function in such a capacity by demonstrating and practicing this strategy in the classroom while preparing for life.

Bridging is a strategy used to connect or "bridge" areas such as academics, personal/social, vocational and daily life. When lessons systematically include bridging, students receive practice in generalizing strategies to other life activities. At the same time, teachers can examine students' previous experiences which might enhance or inhibit learning. (See Resource section for an example of *Bridging*)

Modeling may be necessary for students who have a difficult time utilizing or selecting a strategy to be used in a particular situation. Teachers often must verbally and physically rehearse problem solving. Demonstrating how to do a task is one thing, but demonstrating (by speaking and doing) the steps may add another dimension of understanding for some students. For example:

> A teacher wants to teach students the five steps in a recommended procedure for maintaining a battery. First, the car hood is opened to check the electrolyte level in all cells. Next, corrosion is cleaned off around the battery terminals and top. The battery is then checked with a testing instrument such as a hydrometer. And finally, the battery is re-charged if it is in a discharged condition. The teacher thinks aloud the steps while demonstrating them. Then says aloud "That was only four steps. What did I forget?" The teacher rehearses thinking back through the steps aloud and can't figure out what was overlooked, then talks to some of the students and they can't think of anything left out, so they consult the book and discover together that step number two was left out. Water was to be added if the electrolyte levels were low.

This type of demonstration of the process, the problems and solutions need to be modeled for some students.

Concept attainment is designed to teach basic concepts and to help students become more efficient at learning and creating new concepts. It provides tools for organizing information and approaching problems (Joyce & Weil, 1986). This model of teaching is designed to produce long-term learning by grouping or organizing information into categories for memory and retrieval. In Phase One of this strategy, the teacher presents labeled examples such as fertilizers, computers, deciduous plants, etc. Students compare attributes in positive and negative examples. They then generate and test their hypotheses. Finally, they state a definition according to the essential attributes. For example:

> The teacher is teaching a unit and wants the students to attain the concept of deciduous plants. Students compare the likeness and differences in the plants to determine which are and are not deciduous. Students describe deciduous and test each plant to determine the results. From this example, judgments are made to define the essential attributes of a deciduous plant. This experiential learning for concept attainment increases long-term memory. It is important for students to "see" examples. Most instructional materials, especially textbooks, are not designed to allow for this type of concept attainment.

Discussion of how to make the determination should follow the experience. This type of discussion provides a clear example of how to think through a problem--a skill which needs to be taught.

Direct instruction as an instructional method is excellent for teaching declarative knowledge (facts/rules) as well as the procedural/elaborative knowledge (steps of problem solving, classification/sorting). Specific attention must be paid to generalization of these skills in other situations. Teachers must provide opportunities for students to generalize the skills in other settings. Components of direct instruction are described by Haring and Schiefelbusch (1976) as:

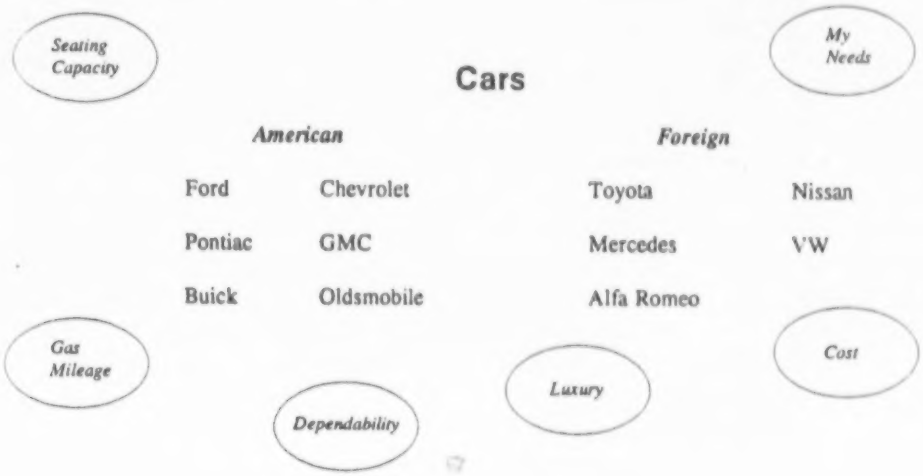
1. Assess learner characteristics.
2. Establish instructional goals.
3. Systematically plan instruction by delineating component objectives and task sequences.
4. Use instructional materials, strategies, settings and motivational events matched to the learner characteristics.
5. Implement instruction considering the above components and provide continuity and momentum.
6. Use motivating consequences and evaluate mastery of objectives.
7. Monitor student success to determine if goals have been achieved.

Transdisciplinary/Life application offers the connection between learning in school and applying it to real life. Relating content areas to daily life and allowing students to do this, may increase the motivation of some students. The best method of accomplishing this interconnection is to utilize the strategy of bridging. (See Resource section for an example of *Bridging*)

The most important aspect of instructional strategy training is the extent to which students can function independently after being taught strategies. It is important that students are taught a variety of strategies for a number of situations, so that self-learning and generalization of skills may be accomplished.

Q. What are Some Examples of Cognitive Strategies?

A. Cognitive strategies are those techniques the student uses to acquire knowledge. These strategies must be taught to students just as reading, math or other subject areas must be taught. Students acquire knowledge based on schema which are abstract knowledge structures that organize familiar experiences and provide a framework for making inferences (Schank & Abelson, 1977). Schema theory allows us to place an order on the units of information being discussed or presented. The schema takes into account everything we know about a topic and puts it into some type of framework. For example, we might consider the best buy in cars. We begin by thinking:



Decision_____

We place each car within the categories and decide which one fits our needs (and pocketbook). For some people, this type of task is extremely difficult. Knowledge of a particular type of car or the speeds at which a car moves may be the only factors examined or even considered in the purchase. Just as we organize this information about cars, we order the information being presented in classrooms. Students often need a picture of *what* is to be learned and need to be taught *how* the information presented fits within that picture.

Some examples of cognitive strategies include:

Critical outlining offers the teacher or student an opportunity to pose questions in order to find important information in a text. A few examples include *timelines* or chronologically ordered sequences of events, *framed skeletons* in which parts of the outline are missing and *cause and effect*.

Example of Critical Outlining
The Health Occupations Instructor wants the students to describe the flow of blood from the heart, to the lungs, throughout the body and back to the heart. She provides a framed skeleton for the students to trace the flow of blood from the heart and back. She also asks students to list a chronologically ordered sequence of events describing that same flow of blood throughout the body. Students list the steps aloud, written and diagramed with a description of the flow. Finally, the teacher might also ask students to examine the cause of blood flow to various parts of the body, while examining the results if no blood flows to those parts.

SQ3R (Cheek & Cheek, 1983) enables students to acquire study skills needed for comprehending written information. SQ3R represents the steps in the process of:

Survey - skim the chapter titles, headings, subtitles, chapter summary, graphs and captions.
Question - turn headings into questions, trying to answer based on prior knowledge.
Read - actively search for answers, highlighting answers as they read.
Recite - paraphrase answers to heading questions and give examples.
Review - respond to all questions, connect notes from class to main headings.

(See Resource section for an example of *SQ3R Worksheet*)

Multi-Pass is similar to SQ3R and is used to gain information from texts or other materials. This strategy works well when used for students whose reading is at least 4th or 5th grade level. The teacher using this strategy should model it first and talk aloud while modeling. Students verbally rehearse the steps, practice the steps and the teacher gives immediate positive and corrective feedback. The strategy is as follows:

Survey "pass" is used to familiarize yourself with the chapter by reading the title, introductory paragraph, subtitles and major headings, illustrations and captions and the summary paragraph, then paraphrase all the information.

Size up "pass" is used to gain specific information. Questions are read at the end of the chapter, questions that can be answered are answered, clues are identified in the text to answer other questions, headings are turned into questions, text is skimmed for answers.

Sort out "pass" tests one's ability to answer over-all questions. If a question cannot be answered, the student is to go back to the Size up "pass."

Advance organizers/Study guides could be used as introductory material presented ahead of the learning task. Their purpose is to explain, integrate and interrelate the material in the learning task with previously learned material (Ausubel, 1968). It actively involves students in learning and motivation as well as producing well-organized notes. Teachers may design study guides for the first quarter (modeling for student how to design and use a study guide). The organizer or guide can be used to introduce a unit or lesson. It may also be used to study for a test, or in a learning activity packet that allows students to learn at their own pace.

One method of designing an advance organizer or study guide is described below:

1. Turn headings into questions. Write each question on an index card. Put page numbers from the text on each card.
2. On the back of each card, define the words and answer the questions.
3. Go through notes and sort information according to the questions. Note any information on the back of the card.
4. Sort cards into order; rewrite, if necessary, for clarity. Always paraphrase information. Summarizing is an important cognitive skill to develop.

In addition, study guides may be pages written with most of the information to be acquired included on the guide, and blanks left in which to write important terms or concepts. After students have experienced completing this type of study guide, a group study guide might be developed in which the students outline the key components of a unit just covered or one that is to begin soon. Blank space is offered based on the predicted questions that might be covered in such a lesson. Students often need to be taught how to make a study guide that will help them learn.

Example of an Advance Organizer
An interior design or building trades instructor might use an advance organizer when introducing a new unit on housing designs. The organizer might look something like:

Home Designs	**Cost**	**Climate Concerns**
trailer	$18,000	dangerous in windy areas
townhouses	$60,000	tree removal to build new
apartment complex	$200,000	large clearing of land required
houses	$60,000 or more	may be built in a small area

An examination of the cost of construction of each type may also be discussed along with utility considerations, construction materials to be selected and so forth.

Graphic representation offers pictorial representation of ideas. This should not be discounted as a method of learning. If students must comprehend literature, for example, the graphic representation of a setting, a character or even a theme may bond these concepts into memory more than words in an outline.

Colombo method allows students to be investigators and "discover" answers to questions in a unit or about a topic. This strategy helps students talk through problems and come up with solutions on their own based on experiences and information provided. This method resembles graphic representation in that students can even wear a trench coat--just as Colombo did in his "cases." Assuming another identity sometimes allows students to make mistakes. Role playing someone else, through a costume of sorts, is often more motivating. Their self-esteem raises as they model the confidence they perceive this make-believe person would have in this real-life role.

Logical inductive reasoning is an offshoot of discovery learning adapted for slow learners by Goldstein and Goldstein (1980) from Dewey's five stages in teaching reasoning which included:

Stage 1 *Experience* - the first contact with new material.

Stage 2 *Problem* - involving a situation that is real to students.

Stage 3 *Data* - information resources derived from students past and present experiences.

Stage 4 *Hypothesis* - suggested solution to problem based on data.

Stage 5 *Testing* - verify validity of hypothesis.

The reasoning sequence includes five steps also. These steps are:

1. *Labeling* the elements of the problem identified.
2. *Detailing* the elements described.
3. *Inferring* the proposed possible solutions.
4. *Predicting and verifying* to solve the problem and evaluate the answers.
5. *Generalizing* to identify the rules underlying the solution proposed.

Generalization of this problem solving strategy is the most important step in the process of logical inductive reasoning. All lessons should be able to be generalized either in the classroom or in another community setting.

Mnemonics utilizes key words for learning and recalling information. It is a device, procedure or operation used to improve memory (Scruggs & Mastropieri, 1990). Material is elaborated, allowing it to be systematically retrieved. An example of mnemonics is rhymes or raps to describe a sequence, function or concept to be remembered. Sentence making is another example of the use of mnemonics in which a sentence is made out of key words or phrases; for example, EGBDF (Every good boy does fine) in music or Roy G. Biv (Red, Orange, Yellow, Green, Blue, Indigo and Violet) in art. Paired associates may help students learn by considering that D = 500 (Indy 500), C = 100 (century), etc.

Mnemonic strategies enable students with learning disabilities and other academic difficulties to utilize the information being provided and to retrieve it at a later time. Keyword mnemonics employs acoustically similar words as meaningful substitutes for words that may be unfamiliar to the learner. For example, in teaching the unit on the suspension system in auto mechanics, the teacher might employ the use of some suspenders (either visually or verbally) to help the students make the association between suspenders and suspension--understanding they both help support something.

Pegword mnemonics provide a visual image of an object that rhymes with a number such as one is sun, two is zoo, three is knee, four is door, five is hive, six is sticks, etc. Whenever items must be remembered in sequence, the student could form an association with the object instead of the number. For example, in custodial maintenance the student is asked to complete janitorial tasks in order. The first step is to sweep the floors, then empty receptacles, then vacuum rugs, mop floors and so on. The pegword mnemonics would be used to visually draw up the image of the sun shining on the broom (sun/one/sweep). Next the student would think of a zoo full of dirty receptacles to be emptied (two, zoo, receptacles). The third step is to vacuum, and the student would remember three/knee/vacuum or three knees on the rug to be vacuumed. Students choose their own mnemonics and associations, but they must be taught to use this method.

Spelling mnemonics offer an important association in relationships between words that are difficult to spell and those that need to be spelled correctly. Scruggs and Mastropieri (1990) provide the example such that when the word cemetery is to be spelled, the schwa sound is represented by the letter E. As a matter of fact, there are three E's in the word. One way to use spelling mnemonics is to remember, "She screamed 'E-E-E' as she ran past the cemetery." Use of spelling mnemonics enables many students to spell otherwise difficult words.

Mental imagery is a form of a mnemonic device in which pictures in the mind's eye allow one to recall information. This strategy helps students remember information by recalling where it was used (movement). This is especially helpful for visual and kinesthetic learners who need to draw a mental image of some action to recall each of the steps in sequence and complete a self-evaluation.

Elaboration provides the learner with an opportunity to exaggerate information to be learned by drawing up a mental picture and adding on details to sharpen the memory. It builds up a context and meaning for the information to be remembered, usually based on prior knowledge. This strategy deals with time and words more than space and movement.

Verbal rehearsal is commonly used by many people to remember information. We repeat a phone number or apply a new routine to other well-known tasks (i.e. rules of subtraction borrowing, SQ3R and so forth). The student verbalizes the rules or steps aloud, thus allowing the teacher or peers to help correct errors. Eventually the rehearsal is no longer needed as the student rehearses silently or performs automatically.

Talk aloud is a strategy useful for any subject and any topic. The student (after much modeling and practice) talks out the problem. Stating what is known and what needs to be answered, the student solves problems systematically and can do some self-checking in the process. This strategy can be used for math, science, vocational courses, social studies, reading, etc.

Mapping is a specialized outline which provides the student more freedom than a structured outline to see the parts of the whole or vice versa. Mapping may be used as a method of introducing a unit, explaining a concept, preparing for a test and/or organizing notes (Kearns, 1989). (See Resources for an example)

GLP helps facilitate note taking during lectures through **G**uided **L**ecture **P**rocedures. First students are told the lesson's purpose and objectives. Students write them down and then listen. Midway through, the lecturer stops and instructs students to write in brief form all the information they can recall. The lecture is completed, and students discuss it in small groups with teacher guidance. Finally, students add to their notes as information is shared and summarized (Kelly & Holmes, 1979).

HEART is a study strategy. Each letter in the word HEART is the first letter of a different step of the study system. (See Resources for an example). The five steps to the system include:

H - How much do I already know about this topic?
E - Establish a purpose for studying.
A - Ask questions as you study.
R - Record answers to your questions.
T - Test yourself.

Q. Why Should I Teach Strategies?

A. Though we often speak of the teaching-learning partnership, we most frequently do something **to** the learner (Kusler, 1982). We must begin to believe that lasting change will affect the learners, and this change can take place in our classrooms as we utilize both instructional and cognitive strategies for teaching students to learn how to learn in new environments.

Q. How Often do I Need to use Instructional or Cognitive Strategies?

A. Instructional strategies should be incorporated into each lesson plan on a daily basis. As lessons are planned, they should include a variety of techniques for meeting learner's needs and allowing them to gather and use new information. Cognitive strategies should also be taught. However, it is advantageous to teach one strategy at a time so students can process the information and determine when and if it works for them.

Q. How can I Determine if the Strategies Being Used are Effective?

A. The same observations and discussions which allowed the instructor to determine which students are using strategies may be used to determine if the strategies are effective for the students. It is important to remember that some strategies will work very well for some students, while it will appear totally confusing to others. It is also important to remember that some strategies may work well for a student in one task, but not in another. That is why it is important to incorporate a variety of instructional strategies in each lesson plan and to teach a number of strategies to all students.

Q. Where can I get More Information About Both Types of Strategies?

A. Articles are being written in nearly every current periodical regarding strategies and their use in the classroom. Below is a list of some resources for further information.

Instructional Strategies for Special Education Students in Regular Vocational Classes: A Preservice Handbook (1988), published by:

Resources in Special Education
650 University Avenue, Room 201
Sacramento, CA 95825

Models of Teaching (1986) (3rd edition) by Bruce Joyce and Marsha Weil, published by:

Prentice-Hall, Inc.
Englewood Cliffs, NJ 07632

Teaching the Learning Disabled: A Cognitive Developmental Approach (1988) by Kim Reed, published by:

Allyn and Bacon, Inc.
160 Gould Street
Needham, MA 02194

A Guidebook for Teaching Study Skills and Motivation (1987) (2nd edition) by Bernice Jensen Bragstad and Sharyn Mueller Stumpf, published by:

Allyn and Bacon, Inc.
160 Gould Street
Needham, MA 02194

Resources

- Sample Strategy Evaluation
- Bridging
- Example Worksheet for SQ3R
- Mapping
- HEART Example

Sample Strategy Evaluation

Directions:

Ask students to perform a new task in the classroom or shop. Provide clear oral directions. Observe students to determine the following:

Student's Name	Follows Oral Directions	Solves Problem	Functions Independently

Other observations might be made to determine:

Student	Asks questions	Draws upon prior knowledge	Works with others

BRIDGING COMPARISON LESSON TO READING AND COMPREHENSION

GOAL: Troubleshooting an engine

OBJECTIVES: 1. Explain troubleshooting and how analysis can lead to possible causes and cures.
2. Listen to engines and accurately troubleshoot.

PROCEDURES

Input	Elaboration	Output	Checking Strategies	Summary	Other Content Areas	Personal Life
Watch instructor troubleshoot 2 engines. Skim chapter 16 on Engine Troubleshooting. Listen to intro from instructor. Outline main points of chapter. Read questions in chapter. Read chapter carefully. Listen carefully to instructor explain information. Map out chapter details. Listen to tape of engine sounds to determine trouble. Discuss information in chapters with class.	Know the purpose of reading the chapter. Ask questions regarding new information. Use only the important information. Think about what troubles might be. Pick out details to remember about each section. Summarize information. Plan steps to use to troubleshoot engines. Keep all facts and notes in mind to determine problem. Discuss why it is one problem vs. another.	Think before you begin to read or troubleshoot. Put outline into a map. Write clearly.	Check to make sure you've read it all. Write down what you remember from lecture. Proofread to make sure all information is accurate. Write personal notes regarding engine sounds.	What thinking skills have we used?: Questioning Discussion Main ideas Details Relevant information Outlining/mapping Listening Hypothetical thinking Planning Problem-solving	English Comparing sounds Categorizing & outlining	Think about personal experiences of engine trouble. Think of times this knowledge might help you or others in the future. Realize job possibilities for the future for someone who is accurate when troubleshooting. Differences of opinions. Sounds may indicate more than one problem.

(Standley, 1988)

Example Worksheet for SQ3R

Survey

1. Look over the chapter title, headings, subtitles, summary, graphs and captions.

Question

2. By examining the above information, what do you think this chapter will include?

_____

_____

_____

3. Write each heading below and a question regarding that heading.

Headings	Questions
_____	_____
_____	_____
_____	_____
_____	_____

Read

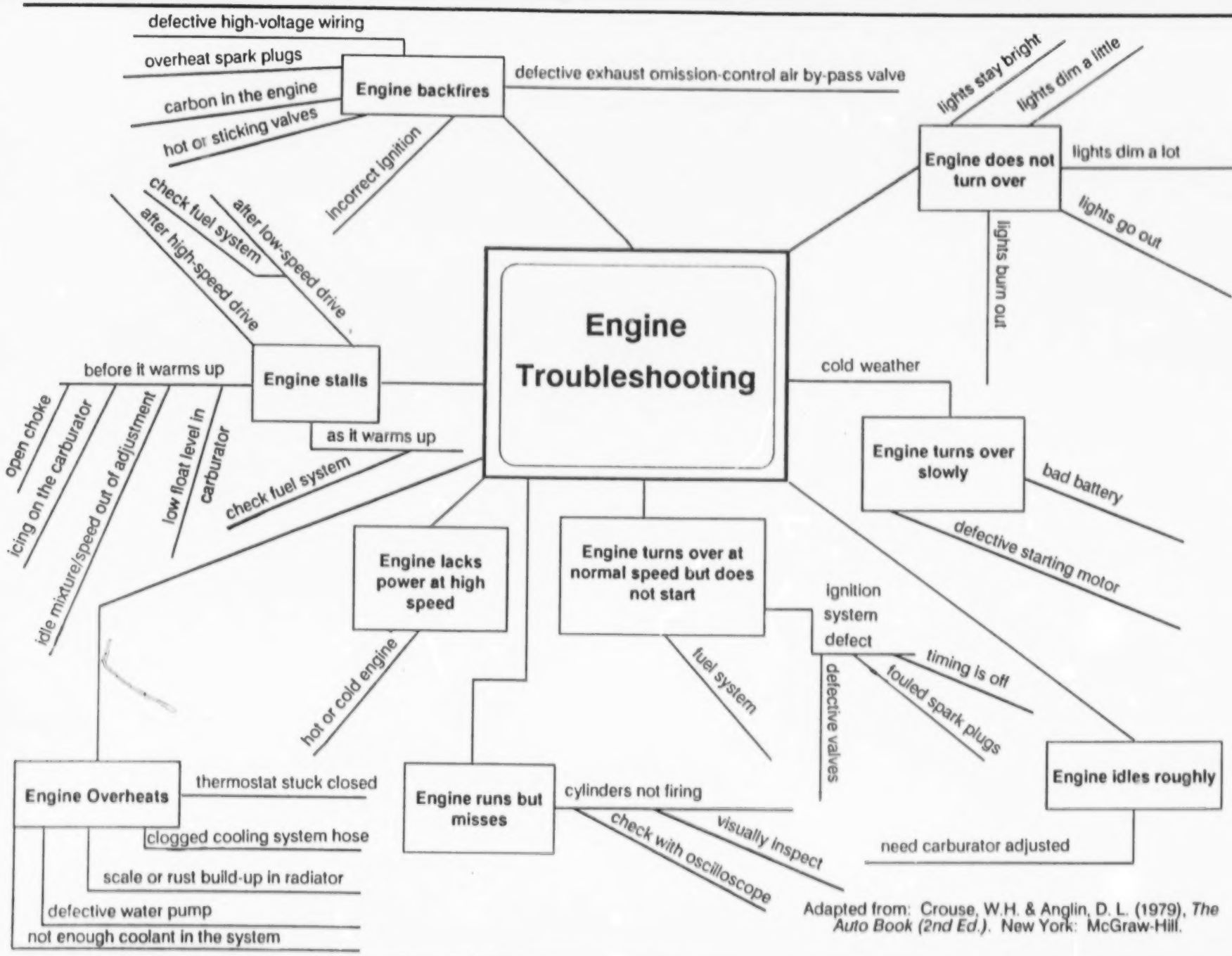
4. Actively read the chapter and look for answers to the questions you wrote above. Make your notes here.

Recite

5. Paraphrase your answers to the questions you wrote above and give examples.

Review

6. Connect questions and notes from class to the main headings of the chapter.



Adapted from: Crouse, W.H. & Anglin, D. L. (1979), *The Auto Book (2nd Ed.)*. New York: McGraw-Hill.

Mapping

Complete the Four Mathematics Word Problems Below by Using the Modified HEART Study System:

1. Mr. Jones bought a 20-ounce steak for $6.75. Mrs. Smith bought 1-1/4 pounds for $6.75. Who got the better buy?

H *How much do I already know from reading over this problem?*_____

_____

_____

E *Establish a purpose for completing this problem.*

My purpose is to find out:_____

_____

_____

A *Ask questions about the problem.* Do I know the meaning of these words?_____

_____

_____

R *Record the steps to solving the problem.* _____

_____

_____

T *Test yourself.*

I checked my figures.	Yes ___	No ___
I checked the solution carefully.	Yes ___	No ___
I checked to see if the answer makes sense.	Yes ___	No ___

(Santeusanio, 1988)

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(HLMod9)